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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,302	11/18/2003	Kenichi Kawase	112857-442	6931

29175 7590 10/03/2006

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EXAMINER
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ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/716,302

Applicant(s)

KAWASE ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Response to Amendment***

This office action is responsive to the amendment filed on 09/25/06. The applicant has overcome only the objections and the 35 USC 112 rejections. None of the prior art references have been overcome. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments and remarks. As a result, the present claims are finally rejected over the same applied art as set forth hereinbelow and for the reasons of record:

### ***Drawings***

1. The drawings were received on 09/25/06. These drawings are acceptable.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuji et al 6432579.

The present claims are directed to an anode and a battery wherein the disclosed inventive concept comprises the specific anode materials.

Concerning claims 1-3:

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Tsuji et al disclose an anode for a secondary battery comprising a sintered material which contains silicon as an anode active material and a carbon material; and a base material (*the current collector*) made of a foil or mesh of conductive metal; wherein the sintered material is integrated with the base material and has a thickness in the range of 10-500  $\mu\text{m}$  (See Claim 5 and 8). Tsuji et al disclose that the silicon containing material may be silicon oxide (COL 3, lines 53-60) and the thickness thereof ranging from 10-500  $\mu\text{m}$  (COL 3, lines 21-25).

Specifically, Tsuji et al disclose a process for producing the anode comprising: preparing an active material containing a silicon-based anode material; coating a base material (*the current collector*) made of a metal foil/mesh with the silicon-based anode material to form a coated film; and sintering the coated film, thereby integrating a sintered material of the coated film with the base material (CLAIM 1). *Thus, the examiner strenuously contends that the part of the sintered material which is integrated with the base material (the current collector) represents the anode active material layer provided on the anode current collector which is alloyed therewith; and the part of the sintered material which is not integrated with the base material (the current collector) represents the layer including silicon oxide provided over the anode active material layer.*

**Examiner's note:** *applicant's specification in the paragraph bridging pages 5-6 states that "silicon...can be cited as a material which is easily alloyed" and that "silicon can form an alloy..." at page 6, lines 23-25. Therefore, it is further contended that the silicon material of Tsuji et al inherently alloy with the base material in the form of the metal foil.*

Concerning claims 4 and 9:

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Tsuji et al disclose using an anode material in the form of a composite powder including carbon material and the silicon-containing material (COL 4, lines 5-10/ COL 3, lines 22-25).

Concerning claims 5 and 10:

Tsuji et al disclose that the silicon containing material may be silicon oxide (COL 3, lines 53-60).

Concerning claims 6-8:

Tsuji et al disclose the battery comprising the anode, the cathode and the electrolyte (CLAIM 6/ COL 5, lines 47-50/ EXAMPLE 1). *Refer to the discussion of claims 1-3 supra* for additional information concerning the specific anode comprising the current collector, the alloyed anode active material layer and the silicon-containing layer.

Concerning claim 11:

Tsuji et al reveals that the electrolyte includes a solid electrolyte containing a Li-ion conductive non-aqueous electrolyte by incorporating a Li-compound (the salt) into a polymer or retaining the organic solvent containing the Li-compound dissolved therein with the polymer (COL 3, lines 33-39).

Concerning claim 12:

Tsuji et al disclose an assembled battery (COL 5, line 48) including a battery can (COL 1, lines 29-30 and lines 38-39). *This can represents the exterior member(s) housing the cathode, the anode and the electrolyte.*

Concerning claim 13:

Tsuji et al disclose the use of lithiated metal complex oxides as cathode active materials (COL 5, lines 1-5).

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Thus, the present claims are fully anticipated by Tsuji et al.

4. Claims 1-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamamoto et al 2003/0054249.

As to claims 1-3:

Yamamoto et al exemplify in **EXAMPLE 9** a current collector 1d made of a copper foil, having an intermediate anode layer 7d consisting of Si-oxide films or a multi-layer film consisting of Si and its oxide films with a total thickness of 4  $\mu\text{m}$  (P0130). *Thus, Yamamoto et al readily envisions an anode collector comprising a plurality of layers (at least two layers).*

**Examiner's note:** *applicant's specification in the paragraph bridging pages 5-6 states that "silicon...can be cited as a material which is easily alloyed" and that "silicon can form an alloy..." at page 6, lines 23-25. Therefore, it is further contended that the silicon material of Yamamoto et al inherently alloy with the current collector in the form of the Cu-foil.*

*As to the method limitation, i.e. the vapor phase, the liquid phase or sinter, it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.*

Concerning claims 4 and 9:

**Example 9** shows the use of silicon-based materials and carbon materials as negative electrode active materials (EXAMPLE 9). *Thus, a simple substance and a Si-based compound.*

As to claims 5 and 10:

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Yamamoto et al exemplify in **EXAMPLE 9** the use of Si-oxide films or a multi-layer film consisting of Si and its oxide films (P0130).

As to claims 6-8:

Yamamoto et al disclose the battery (TITLE/P0072) comprising the anode (CLAIM 1/P0067), the cathode (P0071) and the electrolyte (P0073). *Refer to the discussion of claims 1-3 supra* for additional information concerning the specific anode comprising the current collector, the alloyed anode active material layer and the silicon-containing layer.

As to claim 11:

Yamamoto et al disclose the use of a polymer electrolyte comprising a Li-salt and solvents (P0073).

As to claims 12:

Disclosed is the use of films as external members for housing the anode, the cathode and the electrolyte (P0072).

As to claim 13:

Yamamoto et al use Li-metal complex oxides as cathode active materials (P0071).

Consequently, the present claims are also fully anticipated.

***Response to Arguments***

5. Applicant's arguments filed 09/25/06 have been thoroughly considered but they are unpersuasive.

6. With respect to the art rejection based upon Tsuji et al'579, applicant has mainly asserted that "*the single layer disclosed in Tsuji can not be considered to be multiple layers due to a*

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*purported diffusion or integration or sintering of the anode active material into the current collector*". The examiner disagrees. The examiner is of the view that Tsuji et al'579 still reads on the broadly claimed invention for the following reasons. Applicant's apparent invention encompasses only "an anode collector", "a first layer which is alloyed with the anode collector" and "a second layer". The invention disclosed by Tsuji et al'579 includes coating a base material (the current collector) with Si-based anode material to form a coated film, and sintering the coated film, thereby integrating a sintered material of the coated film with the base material. The examiner might agree with applicant if the invention of Tsuji et al'579 would not require the additional integrating-sintering step. The examiner is of the view that only coating a base material with Si-based anode material produces an anode structure consisting of a first layer coated on the base material (current collector). There is no dispute about that. However, the examiner also is of the view that the additional step of integrating the coated film with the base material by sintering creates a sintered sub-layer between the base material and the Si-based anode material which further alloyed with the base material as Si is a material alloyable with the base material which is metallic. That is to say, Tsuji et al first deposit a coating of a Si-based material onto the base material, and thereafter, carry out integration by sintering. Applicant might be correct if Tsuji et al would only teach to coat it without performing integration by sintering; or if the step of Tsuji et al would only involve integration by sintering without coating; or only one step of coating, or only one step of sintering. Consequently, the examiner believes the invention of Tsuji et al'579 provides the claimed first layer including anode active material which is alloyed with the anode collector on at least a portion of interface therebetween. Thus, the invention of Tsuji et al'579 meets the structural requirement of having three (3) layers as



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claimed by the applicant (*i.e. the current collector, the Si-based anode material, and the sintered-sub-layer interposed therebetween*). Furthermore, nothing in the present claim language stipulates that the first layer and the second layer are materially different so as to exclude the sintered-sub layer of being called the first layer.

7. With respect to the art rejection based on Yamamoto et al'249, applicant has asserted that "*Yamamoto provides a carbon anode 2d made out of graphite...Even assuming that the carbon anode 2d is an anode active material, Yamamoto certain does not disclose that this layer 2d is alloyed with the anode collector 1d*". In other words, because this prior art reference does not explicitly disclose that the carbon anode 2d is alloyed with the anode collector 1d, the rejection based thereupon should be removed. Well, other than advancing the foregoing assertions, applicant has not provided any objective evidence to show that the carbon anode 2d of Yamamoto et al'249 is incapable of alloying with the anode collector 1d. Only problem is that it is not enough that applicant's representative personally believes that the prior art's carbon anode cannot alloy with the anode collector. That is to say, the arguments of counsel cannot take the place of evidence in the record. An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of inherent anticipation/obviousness (See **MPEP 716.01 and 2145: Consideration of Applicant's Rebuttal Arguments**). Simply put a statement or argument by the attorney is not factual evidence. (See **MPEP 716.01 and 2145 Consideration of Applicant's Rebuttal Arguments**). In support of the examiner's position, a quick search of prior art reveals that carbon is an alloyable material or at least is a material which may be included in alloy compositions even though is not a metallic element. The following references US20060205854,

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US20060205531, US20060205194 and US20060202882, just to name a few, makes known that iron and carbon are alloyed (US'854-P0027), a carbon steel (US'531-P0030), a Si-Ge-Carbon alloy (US'194-P0035) and a Co-W-Chrome-carbon alloy (US'882-P0009), respectively.

*(Clarifying point: These references are not intended to be used as prior art references i.e. no new ground of rejection has been added, or this action does not contain new ground(s) of rejection. The references are simply evidentiary references to show that carbon can alloy).* All of the references show suitable alloys composition employing carbon or alloys made of carbon. In light of these teachings, the examiner is of the view that the carbon anode 2d may be alloyed with the anode collector 1d in anode structure of Yamamoto et al'249; and that applicant has not sufficiently substantiated that it is impossible for the carbon anode 2d to alloy with the anode collector 1d in the anode structure of Yamamoto et al'249. Absent objective evidence demonstrating such impossibility, the examiner strenuously contends that they can be alloyed. The burden is shifted to the applicant to proof otherwise as PTO does not have adequate equipment to carry out analytical or chemical tests.

8. In response to applicant's arguments that the prior art of record does not disclose at least one of the claimed method for forming the layer, since the final invention is a product per se (i.e. anode per se), not a process or method itself, the patentability of a product is not determined by the process of making the same. Thus, such arguments carry little merit and add nothing of significance to the patentability of the claimed product unless applicant demonstrates that such a method produces a product exhibiting superior characteristics (unexpected results) and/or a product with a different structure. No evidence has been made of record to support any one of the foregoing.

***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

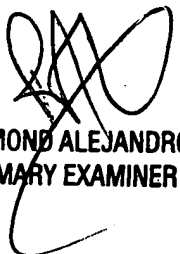
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro  
Primary Examiner  
Art Unit 1745



RAYMOND ALEJANDRO  
PRIMARY EXAMINER